

2305, Elkhart Community Schools

PROJECT ABSTRACT

Elkhart Community Schools serves a population of over 13,000 ethnically and economically diverse students in grades PK-12. Despite the challenges of shifting population demographics and of extraordinary economic times in which the national news media has labeled Elkhart as "hardest hit" by the economic downturn, the school district remains committed to providing outstanding educational opportunities to our students.

Through the analysis of student performance data and of our instructional practice, we have determined that the need to reform instructional practice and infuse technology into our secondary mathematics classrooms is great. Although the gap between ECS ISTEP+ mathematics passing rates and state averages shrinks from nearly 17% to only 3.4% as students pass through our elementary schools, the gap reappears as students move through our secondary schools, growing to a 10% gap by eighth grade and to a 26% gap in Algebra I GQE scores.

Beyond computers, ECS has been able to provide few classrooms with the engaging and interactive tools that researchers such as Robert Marzano have proven can provide a real and measurable impact on student learning. The State Educational Technology Directors' Association (SETDA) has developed a series of briefs highlighting the most "intelligent" ways to use ARRA funding to drive reform in schools. SETDA's description of the core components of a 21st century learning environment includes the following:

- > Presentation Device / Collaborative Learning System (Interactive Whiteboard), and Projector
- > Learner Response Devices for Formative Assessment & to Individualize Instruction
- > Document Camera
- > Robust Software & Digital Content
- > Scientific Calculator

We propose a project to use these tools to impact student learning in secondary mathematics classrooms. This project will offer assistance to students who are marginally prepared for advanced placement courses in science, technology, engineering, and mathematics through the creation of engaging classrooms with a focus on standards-based (rather than "procedures-based") instruction. This effort proposes to increase the academic achievement and engagement of all math students, and should

most greatly benefit those students typically under-represented in AP and STEM courses including females, students of color, students who are English language learners, and students who are economically disadvantaged. Those students will get help with content knowledge, preparation, study skills, and adjustment to rigorous coursework.

Additionally, this grant would be used to provide professional development opportunities for teachers to effectively integrate this technology into the curriculum to maximize its impact on student learning. These opportunities would be organized such that a collaborative mentor/train-the-trainer environment would be created, building capacity for the acquired teaching skills to be sustained beyond the funding period of the grant.

To ensure the success of this project, we will establish three critical partnerships. First, having more access to and greater experience integrating these instructional tools, teachers and leaders from the Concord Community Schools will collaborate with our teachers to help us achieve our project goals. Second, we will engage a university partner (described herein: either Purdue University, Western Michigan University, or the University of Illinois at Chicago) to help us to develop our teachers skills in using a problem-based learning pedagogy with 21st Century tools. Our third partner will be SMART Technologies, who will provide training and access to robust software and a rich set of online digital content including thousands of teacher-created lessons. Collaboration with our partners will take place via face-to-face meetings, e-mail, two-way video conferencing, and available online collaboration tools.

NEEDS/BASELINE

Most students in Elkhart Community Schools are struggling with the challenges of poverty and/or learning English. In 2008-09, 62% of the district's students were eligible for free or reduced-price lunches, and 2415 students (18%) were language minority students. Both of these numbers are expected to rise significantly in 2009-10. Almost half of the students in 2008-09 (47%) represented racial minorities. The outcome data shown below for the district clearly points to a need to innovate.

- > Only 15% of the high school Algebra I students passed the Spring 2009 End of Course Exam (required for graduation);
- > A scant 63% percent of Elkhart's students graduate in four years, compared to the state average of 78%;
- > The most recent (2007-08) SAT math average for the district is 480, compared to a much stronger 508 for the state;

- > Only about one-half of the secondary students progress far enough in the math curriculum to take Algebra II;
- > Fewer than 5% of Elkhart's high school students take and pass Advanced Placement exams;
- > No math classrooms in the district currently have consistent access to interactive technologies.

This project will address these student populations at North Side, Pierre Moran, and West Side Middle Schools, at Central and Memorial High Schools, at our partner schools in the Concord Community School District, and at the participating non-public schools within our LEA.

GOALS/OBJECTIVES

[1] Increase student math proficiency in grades 7-12 as measured by percent passing ISTEP+ in grades 7-8 and the Algebra I and II End-of-Course Assessments.

[2] Reduce the number of students failing and retaking mathematics courses.

[3] Reduce the gap between the number of students who pass mathematics courses but fail high-stakes tests.

[4] Increase student access to up-to-date technology tools and electronic learning resources.

[5] Improve motivation and engagement through the integration of proven instructional technologies.

METHODS/ACTIVITIES

Essential to the development of mathematics literacy is the establishment of a high-quality, well-articulated curriculum coupled with research-based, highly-effective instructional model. The mathematics program of the Elkhart Community Schools will focus on the systemic development and implementation of a standards-based curriculum and Problem-Based Learning (PBL) pedagogy. Integration of technology will be a fundamental component to facilitate the PBL style of teaching, learning, and assessment of mathematics (National Council of Teachers of Mathematics, 2000). Technology will improve the efficiency and quality of the PBL style of instruction.

Interactive whiteboards (IWB) integrate visual, auditory, tactile, and kinesthetic learning processes that provide teachers engaging ways to create multisensory models of concepts and skills. Through access to the Internet and the many graphic and digital curricular resources available through IWB educator support websites, teachers can demonstrate concepts and skills within contexts that are relevant to the lives of students. Additionally, Learner Response Devices (LRD), often called "clickers," allow students to respond at their seats using handheld devices and to have their responses immediately tallied, displayed, and saved, providing teachers with an efficient process for assessing student understanding in real-time. This provides teachers with the opportunity to make instructional decisions "at-the-moment" rather than at the end of a unit or on a yearly high-stakes test.

Uses of the classroom technologies will include:

- > Presenting and reinforcing learning routines and schedules
- > Eliciting unique and specialized information for instructional presentations or enrichment projects
- > Facilitating individual or small-group learning activities
- > Investigating themes relevant to students' interests, passions and experiences
- > Incorporating interactive learning games
- > Reviewing curriculum content
- > Practicing skills in literacy and numeracy

Specific uses of technology to improve the efficiency and quality of the PBL style of instruction will include:

- > Using a computer, a document camera, and IWB technology will allow teachers to present problems, assist students in understanding tasks, and establish expectations of task products. Additionally, teachers and students will explicitly model initial tasks of problem solving- understanding the problem, asking explicit questions relevant to assumptions and mathematical relationship, and restating the question in their own words.
- > Using a computer, a graphing calculator, a document camera, and IWB technology, teachers and students will use multiple representations to model mathematical problems including real-world simulations, oral and written language, symbolic representations, manipulative models, tables and

graphs, and pictures. The versatility of the IWB technology will extend the range of mathematical concepts and problems accessible to students, enrich the range and quality of mathematical investigations and representations, and enhance the modeling of mathematics.

> Using a computer, a graphing calculator, a document camera, and IWB technology will allow teachers and students to model, investigate, and explain problem-solving strategies using one or more mathematical representation, facilitating student understanding by allowing students to spend more time engaging, conceptualizing, and modeling essential mathematical ideas.

> IWB/LRD technology will increase the capacity of the teacher to facilitate student discourse, engage student thinking, and elicit constructive feedback on student understanding. Students and teachers can efficiently and effectively present various approaches to solving problems, compare and contrast the various approaches, discuss the major concepts and relationship developed through the problem, and justify and evaluate results and methods.

PROFESSIONAL DEVELOPMENT

The Superintendent, Curriculum and Instruction Administrators, the Director of Technology, school principals, project partners, and representatives of the Elkhart Teachers' Association have collaborated to produce the following professional development plan for this effort, and will revise the plan as needed based on the ongoing evaluation of the project. Teachers in participating non-public schools within our LEA will have access to all staff development resources and activities listed.

In January 2010, Curriculum and Instruction administrators, Mathematics Task Force members, department chairs, selected teachers, teacher-leaders from our partner school district, and the Director of Technology will attend initial vendor-led training on classroom technologies.

In January/February 2010, (while awaiting full installation of project technologies to be completed), all secondary mathematics teachers will attend vendor-led on-site workshops in fully-equipped temporary demonstration classrooms. Hands-on practice with project technologies and online digital mathematics content will be provided. These sessions will be supervised by Dr. David Benak, Supervisor of Curriculum and Instruction for Mathematics.

In February 2010, under the direction of Dr. David Benak of ECS and of Wayne Stubbs, Assistant Superintendent

for Instruction for the Concord Community Schools, and Tim Tahara, Executive Director of Services for the Concord Community Schools, Mathematics Task Force members, department chairs, and selected teachers will meet with and observe the classrooms of teacher-leaders from the Concord Community Schools.

In February 2010, Dr. David Benak will provide project school principals and assistant principals with training regarding the classroom technologies and instruction regarding conducting ongoing classroom walkthrough evaluations.

On a monthly basis following initial training, Dr. David Benak and selected teachers will offer voluntary after-school topic-specific training sessions for teachers such as "Using TI SmartView with the TI-84 Graphing Calculator," and "Collaborating and Using Lessons from The Smart Exchange."

On a quarterly basis following initial training, all project teachers will attend additional vendor-led follow-up training sessions to gain additional skills and share experiences.

On a quarterly basis following initial training, exchange teacher meetings with partner teachers at Concord Community Schools will be held.

Continuing from spring 2010, teachers will collaborate via The Smart Exchange (<http://exchange.smarttech.com/>), an online professional learning community featuring training podcasts, lesson sharing, and teacher collaboration.

In July/August 2010, a series of vendor and teacher-led masterclass workshops will be held for teachers regarding advanced use of the project technologies.

Continuing from fall 2010, monthly remote interactive-video teacher collaborations with Concord Community Schools will be held.

Continuing from fall 2010, building mathematics department chairs will lead a sharing of best-practices in regular departmental meetings, and share with Dr. David Benak any additional identified training needs.

FORMATIVE/SUMMATIVE EVALUATION

ECS Directors of Curriculum and Instruction (C&I) Dr. David Benak and Dr. John Hill, project school principals, and Math Task Force members will continuously monitor and document progress in order to make any necessary mid-course adjustments to ensure the project's success. Shawn Hannon, Director of Program Evaluation will oversee evaluation of the following specific project benchmarks and work with the rest of the project leadership team to make ongoing adjustments to the project as evaluation results warrant:

- > Teacher attendance, participation, and enthusiasm in training and collaboration sessions will be tracked, including those activities scheduled with project partners.

- > Ongoing classroom walkthroughs conducted by Principals, C&I Administrators, and Task Force members, and quarterly staff surveys conducted online will show that the number of teachers integrating technology into instruction has increased, that participation in staff development and partner collaborations are strong, and that student engagement and participation has increased.

- > The June 2011 ISTEP+ Proficiency Performance Summary will show that the percentage of students passing Grades 7 & 8 ISTEP+ math has increased by 5 percentage points.

- > The June 2011 INECA Online Summary Report will show that the percentage of students passing the Algebra I End of Course Assessment has increased by 5 percentage points.

- > The June 2011 DOE-AT Report will show that the attendance rates at secondary schools has improved.

- > The fall 2011 ECS Master Course Schedule will show that the enrollment in higher level math classes has increased.

LOCAL MATCH

\$41,000

Supplementing grant funds, we anticipate the use of \$20,000 in local funds for costs incurred to prepare classrooms for the installation of grant-funded equipment and for the wiring of classrooms, \$6,000 for TI SmartView software, and \$15,000 for technical support (technicians) to support classroom technologies. Additionally, we continue to add classroom sets of TI-84 graphing calculators for student use (about \$3,000 per classroom), a practice which will continue through the grant period and beyond. Not including the cost of the calculators, our local commitment exceeds 13% of the \$300,000 maximum base award, and we are prepared to allocate more funds as required to ensure the success of the project.

PARTNERSHIPS

Three critical partnerships will help to ensure the success of our project. First, we will collaborate with teachers and leaders in the Concord Community Schools. Algebra teachers at CCS bring to us their years of experience using technology in the classroom, and have experience and training related to the specific technologies and pedagogies discussed within our grant. CCS was funded by the DOE in Cadre 2 to undertake a very similar project in their Algebra I classrooms, and ECS is very excited to have a partner such as CCS who can jump-start our success based on their experiences.

As discussed in the professional development section of this application, the collaboration between CCS and ECS teachers and leaders will include classroom visits and observations, shared trainings, quarterly exchange meetings, and the use of e-mail and online collaboration tools. In addition, each district's local commitment of resources to this project includes the use of a shared "LifeSize" Interactive Video Conferencing link which will be used to allow additional "face-to-face" experiences without experiencing the normal cost in substitute pay and loss of instructional time that numerous "traditional" visits require.

For their part, CCS intends to use this partnership to extend their successes in Cadre 2 classrooms to other secondary mathematics classrooms which were not included in their initial grant. As our districts are linked by proximity and by many identical initiatives, partners, objectives and friendships, it is not surprising that their mathematics and technology integration goals are strikingly similar to our own, outlined earlier in this document. This partnership benefits both organizations in a profound way: teachers and students alike.

It's also appropriate to acknowledge two other partner organizations, which, though not eligible to receive funding from the DOE through the grant, will play a significant role in our success. First, ECS will engage a university partner to work with our teachers to develop their skills in using a problem-based

learning pedagogy with 21st Century tools. That partner will be identified within the context of the mathematics textbook adoption (happening now), with the university selected based on which has the greatest expertise with the materials selected. The most likely candidates are Purdue University, Western Michigan University, and the University of Illinois at Chicago. Our third partner will be SMART Technologies ULC, who will provide ongoing training and access to robust software and online content including a vast array of teacher-created lessons. Collaboration with these two partners will take place via face-to-face meetings, e-mail, two-way video conferencing, and available online collaboration tools.